

Tarletonbeania taylori, a New Lantern Fish from the Western North Pacific

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(Text-figure 1)

DURING the spring of 1952 a staff of American, Canadian and Japanese biologists was engaged in a study of the migrations, distribution and food habits of the North Pacific fur seal herd wintering off Japan. A small collection of fishes was assembled during the course of these studies, from various sources, principally through the operation of a ten-foot midwater trawl of the type recently developed at Scripps Institution of Oceanography. In the collection were found six specimens representing an undescribed species of the myctophid genus *Tarletonbeania*. The author takes pleasure in naming this new species for Mr. F. H. C. Taylor of the Pacific Biological Station, Nanaimo, whose initiative and enterprise, coupled with the material support of the three governments involved, made the trawling experiments possible.

The photophore abbreviations in the description which follows are those commonly in use in myctophid taxonomy (see Fraser-Brunner, 1949: 1023). All measurements were made with dividers under a dissecting microscope and recorded in tenths of millimeters.

TARLETONBEANIA TAYLORI, new species

Holotype.—A male 68.0 mm in standard length, collected May 27, 1952, haul 5, by Mr. Taylor and others aboard the "Iwate Maru," research vessel of the Iwate Prefectural Fisheries Experimental Station, in a ten-foot midwater trawl hauled at the surface. Locality: 44 miles east of Ohakozaki, Iwate Prefecture, Japan (39° 21' N. Lat., 142° 56' E. Long.). Time: 0140-0223 hours. U. S. National Museum No. 164970.

Paratypes.—A female 67.4 mm in length, collected May 7, 1952, haul 7, under similar cir-

cumstances as the holotype. Locality: 66 miles ES Ohakozaki, Iwate Pref., Japan (39° 03' N. Lat., 143° 21' E. Long.), at a depth of 60 meters. Time: 2201-2248. U.S.N. M. No. 164971.

A juvenile female 33.6 mm in length, collected May 26, 1952, haul 4. Locality: same as that of holotype, at a depth of 66-100 meters. Time: 2235-2347. U.S. N. M. No. 164972.

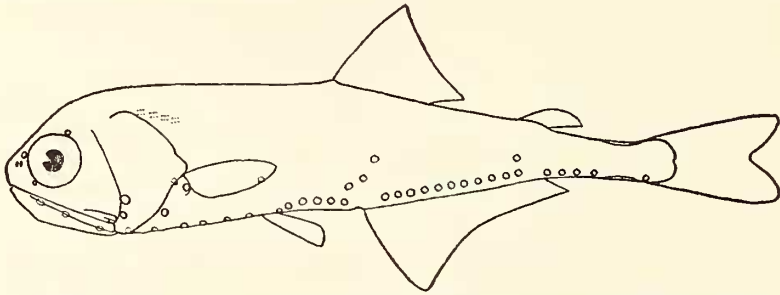
A juvenile female 30.4 mm in length, collected May 26, 1952, haul 4. Locality: same as that of holotype, at a depth of 88-140 meters. Time: 0001-0125.

A male 67.3 mm and a female 70.6 mm in length, collected by Mr. Ford Wilke on April 7, 1952, from the gullet of a Dall porpoise (*Phocoenoides dalli*) killed 10 miles east of Kinkazan, Iwate Pref., Japan (38° 17' N. Lat., 141° 48' E. Long.).

Description.—General body form approximating closely that of *Tarletonbeania crenularis* (Jordan & Gilbert) as described by Bolin (1939: 100-105). In both juveniles and adults the dorsal and ventral contours converge equally from the vertical of the insertion of the pectoral fin to the very slender caudal peduncle. Greatest depth at or slightly in advance of ventral insertion, 4-5 in length; least depth of caudal peduncle 4.3-6.0 in head, less deep in juveniles than in adults. The 70.6 mm female is mature and ripe with a distended and turgid belly; a more normal ventral profile is resumed behind the anus. In the adult the head is bluntly rounded and the mouth terminal. In the two juveniles the snout is more pointed and protrudes somewhat beyond the subterminal mouth. Snout 5-9.5 in head; relatively longer in juveniles than in adults. As in *T. crenularis* the forehead of the juvenile is flat or nearly so, that of the adult convex. Head terminating

posteriorly in a blunt fleshy extension of the operculum, extending to or nearly to a vertical through the insertion of the pectoral fin. Head 3.5-4 in standard length. Eyes of moderate size, circular, 3-3.5 in head in adults but relatively much larger (1.5-2) in young. Pupil about 0.3 the diameter of the eye. Interorbital convex, its bony width equal to eye in the adult, equal to 0.5 of eye in young; 3.3-4 in head. Maxillary and premaxillary extending far behind orbit, posterior end of maxillary but slightly expanded; its length, as measured from tip of snout, 1.3-1.5 in length of head. Broad bands of cardiform teeth on premaxillaries, palatines

anus or anal origin; distance between origin of adipose and base of midcaudal ray equal to or slightly less than length of head. Anal fin inserted immediately behind anus; origin of anal to snout 1.6-2 in standard length. The final anal ray originates below the first AOp or slightly anterior to it. Length of anal base 4-4.8 in standard length. Pectoral inserted low, its origin about equidistant from posterior end of maxillary and VLO and 0.25 of standard length from snout; extending to or slightly beyond VLO, its length 1.8 in head. Ventral fin inserted below or slightly in advance of VLO and extending posteriorly to the fourth or fifth VO



TEXT-FIG. 1. *Tarletonbeania taylori*, adult male. Drawn from holotype, U. S. N. M. No. 164970.

and dentaries. A cluster of 7 similar teeth on each side of the vomer and an elongate patch on each entopterygoid. Ceratobranchials, basibranchials and anterior gill rakers bear numerous teeth, individually or in clusters.

Gill rakers 6 (4-6) + 1 + 10 (8-10), plus an occasional rudiment on epibranchial or ceratobranchial. This count, although slightly less than that of the ten specimens of *T. crenularis* counted by Bolin (op. cit.) will probably be found not to differ significantly. The structure of the individual rakers is variable. On the first arch, the longest raker is about half an orbital diameter in length; those of the second and subsequent gill arches are reduced to low bony knobs covered by prickles and often surmounted by a thin short spine—a condition approaching that on the first arch of the species of *Centrobranchus*.

Fin formula: D. 13 (12-14); A. 18 (17-18); P. 14 (13-16); V. 8 (8-9).

Origin of dorsal slightly closer to snout than to proximal end of midcaudal ray, on a vertical with the fourth, fifth or sixth VO photophore. Length of dorsal base 6-6.4 in standard length, its terminus over the fifth AOa organ. Adipose fin inserted over last AOa or AO interspace, the distance between its origin and that of the dorsal equal to that from pectoral insertion to

photophore (to the third in the gravid female).

Body squamation complete, the scales rounded or crenate; 52-53 scales in a longitudinal series. A scaly sheath covers the bases of both dorsal and anal fins and enlarged scales cover the bases of the lower pectoral rays and inner ventral rays. With the exception of a few scales overlying the preoperculum, the heads of all six specimens are nearly naked, in contrast to the moderate head squamation of *T. crenularis*. The variable placement of the scales remaining suggests strongly that the heads of the Japanese specimens bore scales during life but became denuded or nearly so during the collection and preservation. The scales covering the supra- and infracaudal glands of the males are slightly distended, apparently due to the underlying bulge of luminous tissue, but are otherwise indistinguishable from the other scales of the midline. Although the course of the lateral line is evident for some distance along the body beneath the scales, only the most anterior 3-5 overlying scales are characteristically modified.

Measurements, in thousandths of standard length, of the holotype followed in parentheses by the range of measurements of the five paratypes: head length 285 (245-280); snout 31 (28-53); postorbital 166 (71-163); orbit 82

TABLE I. COUNTS AND PROPORTIONAL MEASUREMENTS (EXPRESSED IN THOUSANDTHS OF STANDARD LENGTH) OF *Tarletonbeania crenularis* AND *T. taylori*.

	<i>T. crenularis</i>	<i>T. taylori</i>
Fin rays		
Dorsal	12 (11-14)	13 (12-14)
Pectoral	13 (12-14)	14 (13-16)
Ventral	8 (7-8)	8 (8-9)
Serial photophores		
PO	6 (5-8)	6 (5-6)
VO	6 (5-7)	6 (6-7)
AOp	4 (3-5)	5 (4-5)
Gill rakers	5(5-6)+1+11(10-11)	6(4-6)+1+10(8-10)
Measurements		
Length of head	281 (253-325)	264 (245-285)
Length of maxillary	182 (160-239)	176 (168-182)
Snout to pectoral insertion	276 (245-310)	261 (238-276)
Snout to ventral insertion	400 (380-428)	377 (345-397)

Data for *T. crenularis* from Bolin (1939: 100-105) based on 50 specimens 18.1 to 79.2 mm in standard length; those for *T. taylori* from the 6 Japanese specimens ranging in length from 30.4 to 70.6 mm.

(75-161); maxillary 176 (168-182). Snout to dorsal origin 522 (491-510), to adipose origin 788 (756-773), to anal origin 570 (523-588), to pectoral origin 273 (238-276), to ventral origin 397 (345-389). Distance from origin pectoral to origin dorsal 265 (260-300); from pectoral to ventral 148 (113-157); dorsal to anal 215 (196-227); dorsal to ventral 241 (229-278); ventral to anal 176 (148-212). Base of adipose to base of midcaudal ray 243 (223-252). Dorsal base 162 (158-172); anal base 251 (208-245). Length of pectoral 147 (144-149); pelvic 110 (99-113). Depth of body at dorsal origin 207 (184-245); greatest depth, at or before ventral origin, 221 (208-252); least depth caudal peduncle 66 (45-59); length of caudal peduncle 215 (197-214).

The photophore pattern approximates closely the condition found in *T. crenularis*. Inconspicuous Dn, Vn and Suo are present. In addition, three or four photophore-like spots are present below the circumorbital ring and one or two are evident behind the eye. These spots may possibly be reduced photophores but are more probably neuromasts of the circumorbital lateral line system. They are present but to a lesser degree in *T. crenularis*. Op₁ smaller than the body photophores, opposite the posterior end of maxillary. Three Br. Op₂ immediately above Op₁ and slightly below the horizontal of PVO₁, larger than the average body photophore. PLO small, about half the diameter of

its neighbors, and situated behind a vertical through PVO₁, below the insertion of the uppermost pectoral ray, but above the PVO₂. Six (5-6) PO, the first slightly behind the vertical of Op₂, the second slightly in advance of PVO₁, the third below or a little behind PVO₂. The first three PO are more widely spaced than the successive three. VLO on a horizontal with PVO₁, on or slightly behind a vertical through VO₁. Six (6-7) VO, the first pair located closer to the midline than the successive pairs. The three SAO form a gentle curve; the first originates on a vertical line tangential to the posterior margin of the last VO and about a photophore diameter from it. Second SAO above and behind the first, the distance between the first and second about 0.2 of that between second and third. Second SAO on or slightly behind a vertical through anus; the third on or slightly before the vertical of first AOa and on a horizontal with pectoral insertion. Eleven (10-11) AOa, the first originating above the third or fourth anal ray, the last above the fourteenth or fifteenth. POL below or behind origin of adipose fin, above or behind last AOa. Five (4-5) AOp, the first behind base of final anal ray. One Prc. Females bear no supra- or infracaudal glands; males have both, the supracaudal being relatively shorter and broader than that of *T. crenularis*. The supracaudal gland of both males originates above the fourth AOp and extends posteriorly to a

vertical at the anterior margin of the Prc. The gland is well developed but not emarginated with black and is overlaid by 6-7 scales. The infra-caudal occupies a comparable position and horizontal extent. In one specimen it originates before and below the last pair of AOp and extends to the anterior margin of the Prc. In a second specimen (the holotype) the gland is less well developed, originating behind the last AOp and terminating a photophore diameter before the Prc.

Discussion: *Tarletonbeania taylori* is certainly most closely related to its trans-Pacific congener, *T. crenularis*, as demonstrated by the slender caudal peduncle, a single Prc; low PLO and pectoral insertion; size and position of the Dn, Vn and Suo; extent, form and dentition of the bones bordering the gape; fin placement and formula; the rudimentary lateral-line and gill-raker structure common to both. Although meristic and proportional differences between the two species are discernable (Table 1) they might well be thought to indicate subspecific rather than specific separation. The infra- and supracaudal glands of the male, however, show clearly the need for recognizing *T. taylori* as a distinct species. The supracaudal gland of *T. crenularis* is elongate, extending from the adipose fin to the procurrent caudal rays; the infra-caudal is absent. In *T. taylori*, on the other hand, the supracaudal is well separated from both adipose fin and procurrent caudal rays and an infra-caudal gland of about the same extent is developed.

The genus *Tarletonbeania* at present is known only from the North Pacific. *T. crenularis* ranges from southern Alaska into Mexi-

can waters and to an undetermined distance off shore. It is often exceedingly common at night in off-shore surface waters and can be collected in quantity under a light with dip net. Although here described from only six specimens from off Iwate Prefecture, *T. taylori* will in all probability be found to range widely and commonly off the coasts of northern Honshu and Hokkaido and northward. Additional distributional data will be available when the material from the food-habit studies of the fur seal and porpoise have been re-examined. These data will be reported in later papers along with further results of the trawling work and a discussion of the stomach contents of the marine mammals taken. When the horizontal and vertical ranges of *T. taylori* are more fully known, the distribution of the two species should be re-examined. Although the occurrence on opposite sides of the North Pacific of two closely related littoral species is not an unexpected phenomenon, it is difficult to visualize an oceanographic barrier complete enough to isolate successfully two pelagic species, one of which is known to be wide-ranging while the other is suspected of being so.

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